

Magnetically Actuated Seal, Phase II

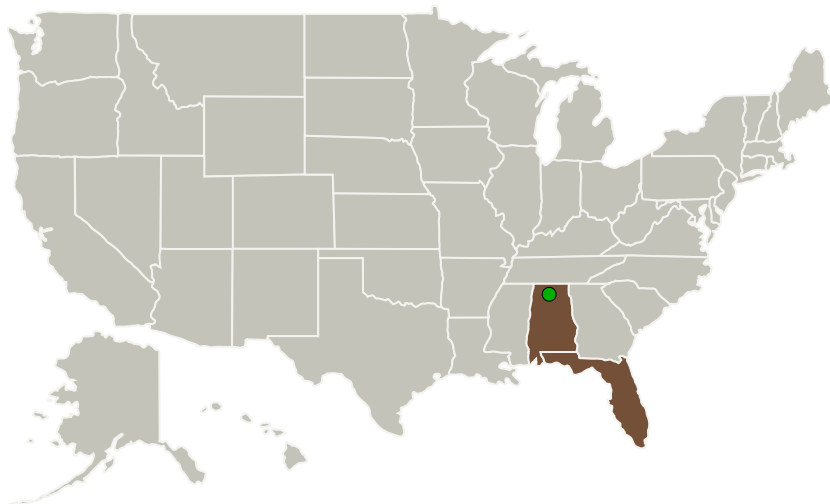
Completed Technology Project (2011 - 2013)



Project Introduction

FTT proposes development of a magnetically actuated dynamic seal. Dynamic seals are used throughout the turbopump in high-performance, pump-fed, liquid rocket engines for a variety of purposes. The most common applications are in the lift-off seal (LOS), inter-propellant seal (IPS), and balance piston seals • high-pressure orifice (HPO), low-pressure orifice (LPO), and inner diameter impeller shroud seal (eye seal). The system solution for conventional seals represents a compromise between the turbopump mechanical design, primarily flowpath, and secondary flowpath design that results in increased leakage, increased seal wear, and reduced balance piston load capacity that reduces performance, throttle-ability, thrust-to-weight, reliability, and operability. The magnetically actuated seal eliminates this compromise and provides significant improvement in performance, throttle-ability, thrust-to-weight, reliability, and operability. Phase 1 resulted in a significant advancement of the technology by demonstrating a magnetically actuated face seal in both ambient and cryogenic conditions, characterizing the seal and actuator performance, and quantifying the performance improvements for the turbopump and engine. Phase 2 will advance the technology from TRL 3 to 5. The technology is applicable to booster engines, in-space engines, and ascent/descent engines.

Primary U.S. Work Locations and Key Partners



Magnetically Actuated Seal, Phase II

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

Magnetically Actuated Seal, Phase II

Completed Technology Project (2011 - 2013)



Organizations Performing Work	Role	Type	Location
Florida Turbine Technologies, Inc.	Lead Organization	Industry	Jupiter, Florida
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Florida

Project Transitions

**June 2011:** Project Start**November 2013:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139073>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Florida Turbine Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Alex Pinera

Co-Investigator:

Alex Pinera

Magnetically Actuated Seal, Phase II

Completed Technology Project (2011 - 2013)



Technology Maturity (TRL)

Start: 3
Current: 5
Estimated End: 5



Technology Areas

Primary:

- TX01 Propulsion Systems
 - └ TX01.1 Chemical Space Propulsion
 - └ TX01.1.1 Integrated Systems and Ancillary Technologies

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System